

Figure 1

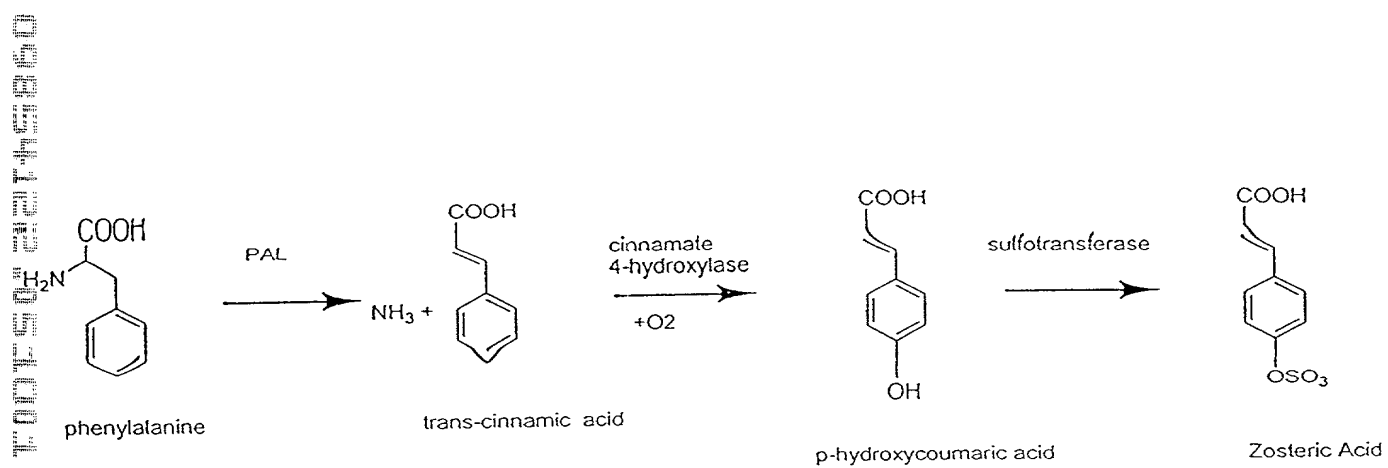


Figure 2

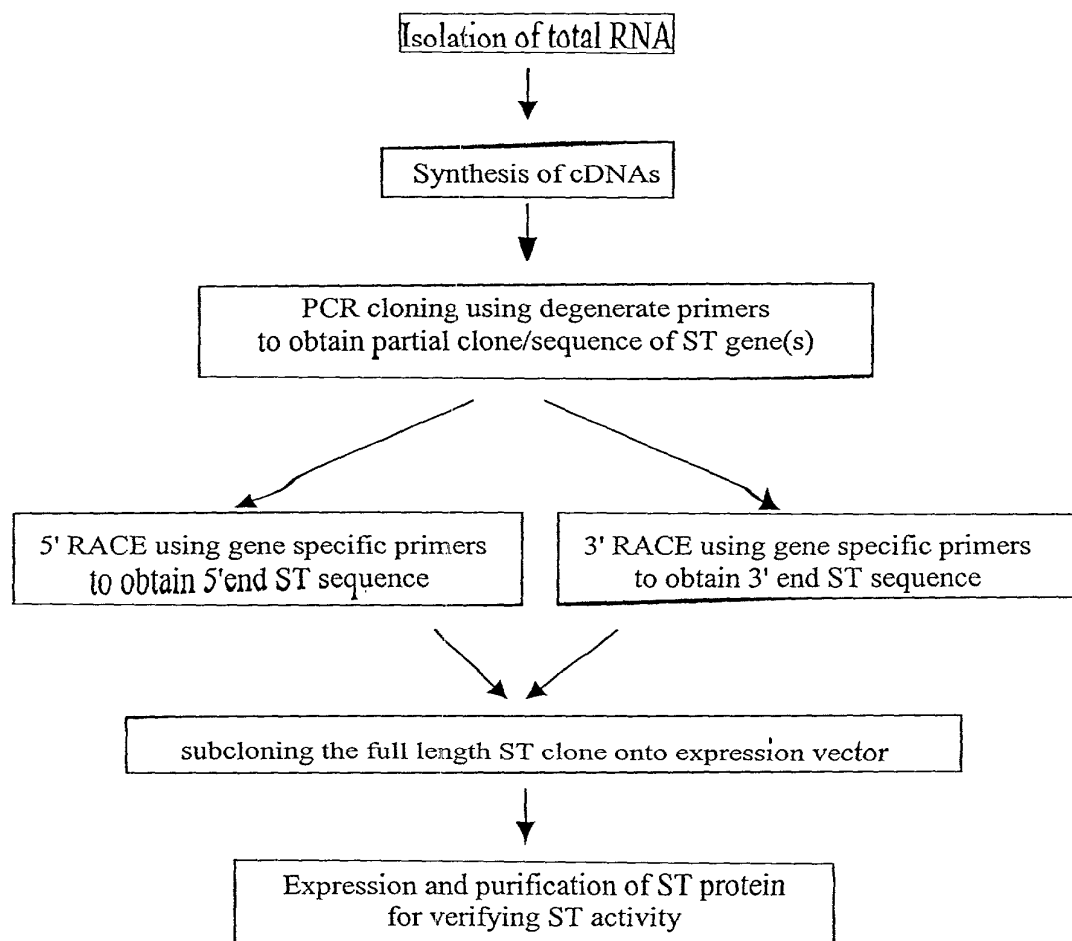


Figure 3

Primer name	Primer Sequence (from 5' to 3')	Protein sequence
Degenerate:		
Z-ST-P14 (5'primer)	TAYCCIAARAGYGGIACITGG	YPKSGTTW
Z-ST-P16 (3'primer)	YTTCCARTCICCIHIIICCYTTYCT	RKGXXGDWK
Z-ST-P17 (3'primer)	YTTCCARTCICCIHIIICCYTTIGC	RKGXXGDWK
Gene specific:		
Z-ST-P18 (5'primer)	ATCTGATTAACCCCGACAAGTTATTGG	
Z-ST-P19 (3'primer)	CCAATAACTTGTCGGGGTTAATCAGAT	
Z-ST-P26 (5'primer)	ATCCGAGCTCGATGGCTGGAATTTTAGC TTTGGAG	
Z-ST-P25 (3'primer)	CTAGAAGCTTACGAATGAATACGATAA TAAAC	

Figure 4

ACGCGGGAATAACTGGAATCGCTGTTGCTTGTAGCTACCACTGATAATGGCTGGAATTTAGCTTTGGAGAAATGTTTCGGATCCAAG 90
T R G I T G I A V A C . L P L I M A G I L A L E K C F G S K

AATGAGCAAGAGAAGGAAGATTCCAAAATGTACAAGAGATATAGAGAGATTGTTTCTTCACTTCCCTCGAATGATTATTGGGGGGAT 180
N E Q E K E E D S K M Y K R Y R E I V S S L P S N D Y W G D

ACCATGAGGTTGTACAAGGGATTTTGGCAAATGGGATATCTTGACCTGGTATCATGGCTTTTGAAGATAATTTCAAGGCTCGAGAGACG 270
T M R L Y K G F W Q M G Y L V P G I H A F E D N F K A R E T

GACATTATCCTTACGACTCTTCCAAAGGCTGGAACGACATGGACGAAGGCACTGACGTTTGCCATCCTAACACGAGATGTTAACCACCCA 360
D I I L T T L P K A G T T W T K A L T F A I L T R D V N H P

TCATCACCAGACATCCACTTTTGTCTTCAACCCTCATTGCTGTGTTCAAAATTTGGAGTATTGTACATGGGTAGAGAAAATACGATG 450
S S P T H P L L F F N P H S C V Q N L E Y L Y M G R E N T M

CCAGACCTCGATATGTTGAATGAATCGCCGAGGTTGTTTGGCCGACACATCCCATACTCTTTGTTGCCGGCGTCTGTTTGAATCGGGA 540
P D L D M L N E S P R L F A G H I P Y S L L P A S V L K S G

ACAAAATCATCAATATAAGCCGCAACCGTAAGAGTACATTTGTGCTTTTGGAAATTTGGCAATCTGATTAACCCCGACAAGTTATTG 630
T K I I N I S R N R K S T F V S F W K F G N L I N P D K L L

GACCTCGAAAAGAGCGTTGATATCTTCGCATCGGGAATCTCTTTTGTGGACCGGAATGGAATTTCCAAGCGGAGTTACCAATGCGGCG 720
D L E K S V D I F A S G I S F C G P E W N F Q A E F T N A A

TCTACTAATTCAACTTGCTATTGTTGAGTTACGAAGAAATGTTAGAGAAGCCAGTTGAAAATGTGAAGAAGCTAGCTGAGTTTCATGGGA 810
S T N S N L L L L S Y E E M L E K P V E N V K K L A E F M G

TGTGGGTTACAGACGATGAGGAGAAACAAGGGATTGTTGATGAGATAGTTAAACTTTGTAGCTTCGACAATCTGAAGAATCAACAGGTG 900
C G F T D D E E K Q G I V D E I V K L C S F D N L K N Q Q V

AACAAAACGGATCAAGCTACAATTCGAAAATCGACAACAAGCATTCTTCAGGAAAGGTGAGGTGAGAGATTGGGCAAACTATCTAACG 990
N K N G S S Y N S K I D N K H F F R K G E V R D W A N Y L T

TCGGAATGATTAAGAACTGGAGACGGCCGAAAAATAAATGAATCAGAGTAAAAGCATTATTATCGTGAAATAAGAAATCTTACATGA 1080
S E M I K K L E T A G K I N E S E . K H L L S . N K N L T .

AACTTCGAAATCTTAATAATTACTGTGAGAAATCGAACTAAATATCTCTTTGTTTATTATCGTATTCATTGTAATAAATAATTTTCA 1170
N F . N L N N Y C E K S N . I S L C L L S Y S F V I N N F I

TTGTTAAAAA 1192
L L K K K K K

09854432-05-4004

Figure 5

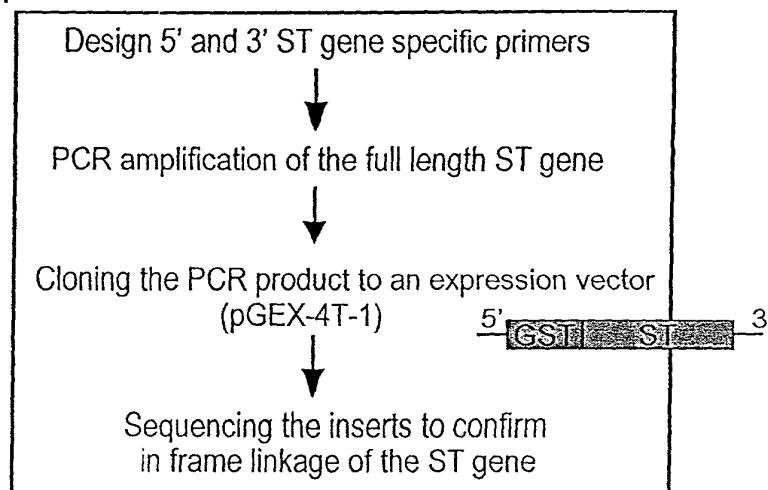
<i>Z. marina</i>	MAGILALEKCFG	SKNEOEKEED	DSKMY	KRYREIV	SSLPS	NDYW	-	GDTMR	LYK	GEW	QMGY	LV	59																																														
<i>B. napus</i>	MSS-----	SSSVDP	YLRDEN	LTQKT	KDLIS	SLPSE	KGWL	VCMY	QF	QGR	WHT	QALL	51																																														
<i>A. thaliana</i>	MSS-----	SSSVPA	YLGDED	LTQET	RALIS	SLPSE	KGWL	VSEI	YEF	QGL	WHT	QAIL	51																																														
<i>F. bidentis</i>	MET-----	TKT--	QFESMA	EMI	KKLP	QHTCS	--	SLKGR	IT--	LYKY	QDF	GLNNI	45																																														
<i>H. sapiens</i>	MELIOD----	TSRPP	LEV	VKGVP	LIK	YFAEAL	GPL	--	--	--	--	--	31																																														
I																																																											
<i>Z. marina</i>	PGIMAFEDN	FKARET	DIILTT	LPKAG	TTWKAL	TFAIL	TRD	-	VNH	PS	SSPT	HPLL	FFNPHS	118																																													
<i>B. napus</i>	QGILTCQKH	FCAKDS	DIILVT	NPKSG	TTWLKAL	VFALIN	RHKFP	VYSV	--	IIL	SCYQ	SAL	109																																														
<i>A. thaliana</i>	QGILTCQKH	FCAKDS	DIILVT	NPKSG	TTWLKAL	VFALIN	RHKFP	VYSV	--	IIL	SCYQ	SAL	111																																														
<i>F. bidentis</i>	EGAILAQOS	FKARPD	DVFLC	SYEKS	SETTWL	KALAYAL	VTRE	KDEFTS	--	PLLT	NI	PHN	102																																														
<i>H. sapiens</i>	-----	OSPO	ARPD	DLLIN	TYPKS	GTTW	VSQILD	MIYQGG	DLEK	CNRA	PI	-----	YV	77																																													
II																																																											
<i>Z. marina</i>	CVQNLE	EYLYM	GRENT	MPDL	DMLN	-	ESPR	L	FAGH	IPYS	L	LEA	SVIK	SGTK	IINIS	SRNR	KST	177																																									
<i>B. napus</i>	LVPFL	GRSL	L---	RS	PDF	DFS	OLS	SPR	LMN	THISH	LSL	PE	SVK	SSS	CKI	YV	CCRN	PKDM	165																																								
<i>A. thaliana</i>	LVPFL	GRSL	L---	RS	PDF	DFS	OLS	SPR	LMN	THISH	LSL	PE	SVK	SSS	CKI	YV	CCRN	PKDM	167																																								
<i>F. bidentis</i>	CIPYIE	KDLK	---	KI	VEN	QNN	SC	FT	P-	MATH	MPY	HVLP	KSIL	ALN	CKM	VY	IYRN	IKDV	156																																								
<i>H. sapiens</i>	RVPFL	GRSL	L---	RS	PDF	DFS	OLS	SPR	LMN	THISH	LSL	PE	SVK	SSS	CKI	YV	CCRN	PKDM	135																																								
III																																																											
<i>Z. marina</i>	FVS	FWK	FCN	LIN	PD	DKLL	D--	L	SKS	VDI	FAS	GIS	FC	GFE	WNF	QAE	EFTN	AAS	TNSN	-	LLLL	LS	234																																				
<i>B. napus</i>	FVSL	WH	FE	GK	KL	AP	ET	AD	YPI	EK	AVE	AF	CQ	GK	FI	GG	FW	DE	VLE	YW	AS	LEN	PNK	VLFVS	225																																		
<i>A. thaliana</i>	FVSL	WH	FE	GK	KL	AP	ET	AD	YPI	EK	AVE	AF	CQ	GK	FI	GG	FW	DE	VLE	YW	AS	LEN	PNK	VLFVS	227																																		
<i>F. bidentis</i>	IVS	FY	FE	GRE	IT	KL	PLE	D	AP	FE	DA	F	DE	FF	YH	GIS	Q	FC	YWD	DEL	LGY	WK	AS	LER	REVIL	FLK	216																																
<i>H. sapiens</i>	AVS	Y	Y	HE	-	HR	ME	KA	HP	E	PG	TW	DS	F	LE	K	F	MA	GE	V	S	Y	GS	WY	Q	EV	QEW	-	-	EL	S	R	TH	FV	LY	LF	192																						
IV																																																											
<i>Z. marina</i>	YEE	M	L	E	K	E	V	EN	V	K	K	L	A	E	F	M	G	C	G	F	T	D	D	E	E	K	Q	G	I	V	D	E	I	V	K	L	C	S	F	D	N	L	K	N	Q	Q	V	N	K	N	G	S	-	-	SYN	292			
<i>B. napus</i>	YEE	P	K	K	T	G	E	T	I	K	R	I	A	E	F	L	G	C	G	L	V	G	E	E	E	-	-	-	V	R	A	I	V	K	L	C	S	F	E	S	L	S	L	E	V	N	R	E	G	K	L	P	S	-	-	279			
<i>A. thaliana</i>	YEE	L	K	K	T	G	E	T	I	K	R	I	A	E	F	L	G	C	G	L	V	G	E	E	E	-	-	-	V	R	A	I	V	K	L	C	S	F	E	S	L	S	N	L	E	V	N	R	E	G	K	L	P	S	-	-	281		
<i>F. bidentis</i>	YED	V	K	K	D	E	T	S	N	V	K	R	L	A	E	F	I	G	Y	P	F	T	F	E	E	E	K	E	G	V	I	E	S	I	I	K	L	C	S	F	E	N	L	S	N	L	E	V	N	R	S	G	N	S	K	G	F	L	276
<i>H. sapiens</i>	YED	M	K	E	N	B	K	R	E	I	K	I	L	E	F	V	G	R	S	L	P	E	T	-	-	-	-	M	D	F	M	V	Q	H	T	S	F	K	E	M	K	K	N	P	M	T	N	Y	T	T	V	P	Q	E	L	247			
V																																																											
<i>Z. marina</i>	SK	IDNKH	FFR	KGE	V	R	D	W	A	N	Y	L	T	S	E	M	I	K	K	L	E	T	A	-	-	G	R	I	N	E	S	E	331																										
<i>B. napus</i>	G	-	M	E	T	R	A	F	F	R	K	G	E	V	G	G	W	R	D	T	L	E	S	L	A	E	V	I	D	R	T	I	E	E	K	F	O	G	S	G	L	K	F	S	C	324													
<i>A. thaliana</i>	G	-	I	E	T	K	T	F	F	R	K	G	E	I	G	G	W	R	D	S	F	E	302																																				
<i>F. bidentis</i>	P	-	I	E	N	R	L	Y	F	R	K	A	K	D	G	D	W	K	N	Y	F	T	D	E	M	T	E	K	I	D	K	L	I	D	E	K	L	S	A	T	G	L	V	L	K	320													
<i>H. sapiens</i>	M	D	H	S	I	S	P	E	M	R	K	G	M	A	G	D	W	K	T	T	F	T	V	A	Q	N	E	R	F	D	A	D	A	E	K	M	A	G	C	S	L	S	F	R	S	E	L	295											

11 •

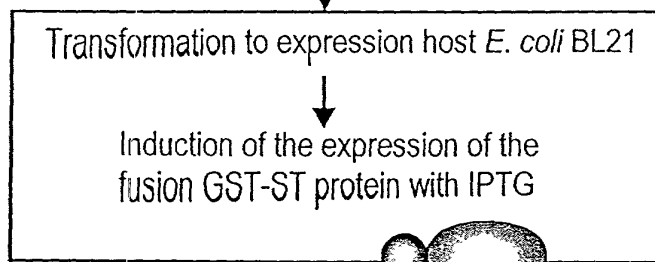
Figure 1 consists of 12 bar charts (a-l) arranged in a 6x2 grid. Each chart shows the percentage of total protein in various fractions (P, S, C, M, L, H, B, V, F, G, R, T) for different cell lines and treatments. The y-axis for all charts is 'Percentage of total protein' ranging from 0 to 100. The x-axis for all charts is 'Fraction' with labels P, S, C, M, L, H, B, V, F, G, R, T. The charts are arranged in a 6x2 grid. The left column (a-f) shows data for 'Control' and 'Treated' conditions. The right column (g-l) shows data for 'Control' and 'Treated' conditions. The cell lines are: (a, g) HepG2, (b, h) H460, (c, i) H1299, (d, j) H1975, (e, k) H2197, (f, l) H226. The treatments are: (a, g) Control, (b, h) Treated, (c, i) Control, (d, j) Treated, (e, k) Control, (f, l) Treated. The data shows that in the treated conditions, there is a significant increase in the percentage of protein in the P and S fractions, and a decrease in the percentage of protein in the C, M, L, H, B, V, F, G, R, and T fractions compared to the control conditions.

Figure 7

Subcloning of full-length ST
gene onto expression vector:



Expression of
ST fusion protein:



Determination of
enzymic activity:

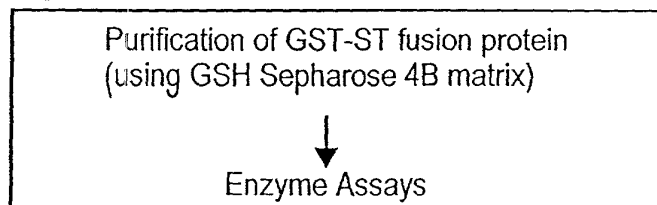


Figure 8

ST catalyzed sulfur transferation:

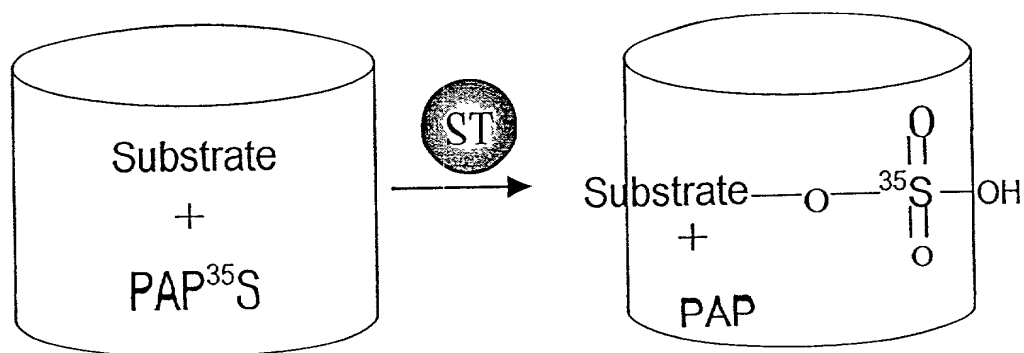


Figure 9

ST catalyzed sulfur transferation:

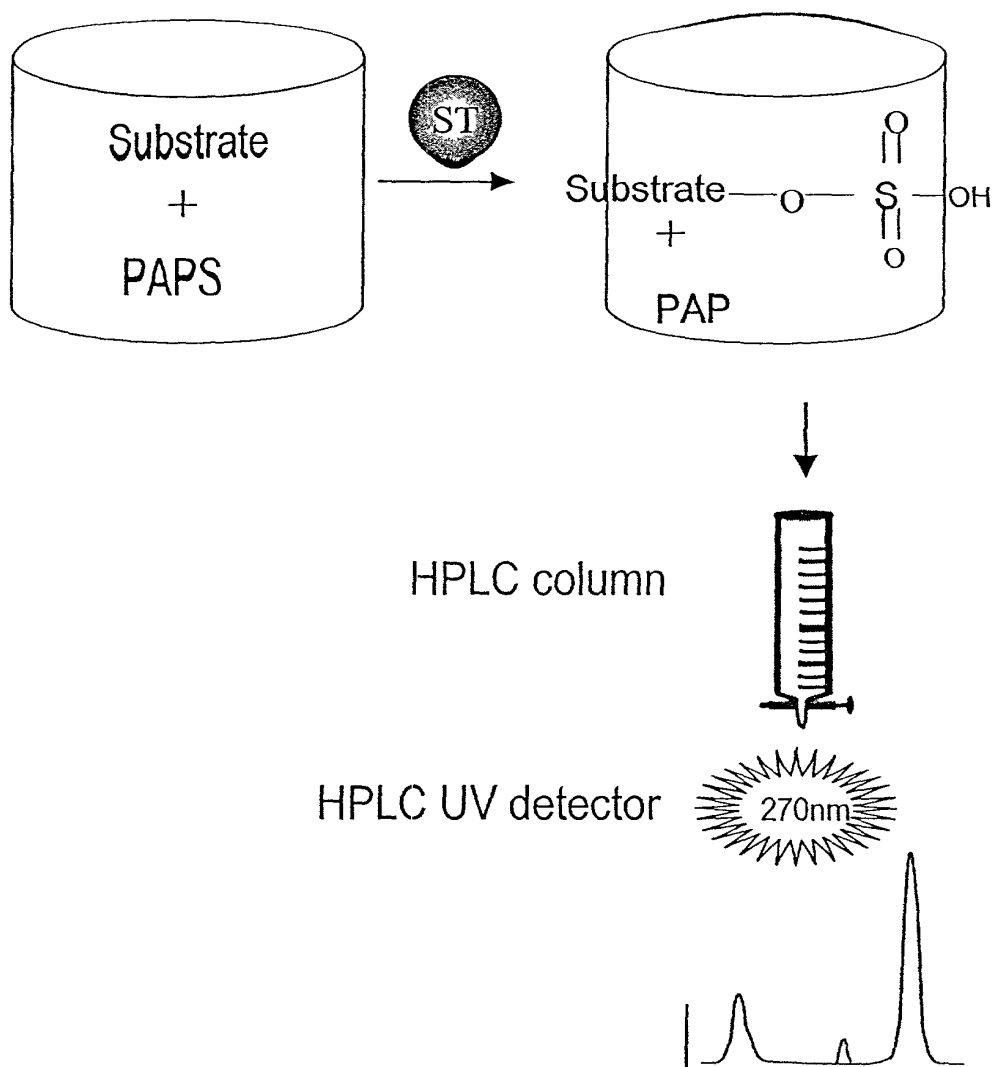


Figure 10

Substrate	Sp. Enzyme Activity (nmol/min/mg)		
	Z. marina ST	Flaveria ST	Rat Dopa/tyrosine ST
Quercetin	60-100	0.27	
P-nitrophenol	0.3		125

Figure 11

Primer Names	Primer sequences (From 5' to 3')	Corresponding conserved Protein Sequences
5' primers:		
Z-ADH-P1	GTIGCITGGGARSCIGGIAARCC	VAWEA(P)GKP
Z-CH-P1	CARRAIATGGTITTYACIGTITAYGG	QD(K)MVFTVYG
Z-PAL-P1	AARCAYCAYCCIGGICARATIGARGC	KHHPGQIEA
3'primers:		
Z-ADH-P5	TTRTARTTICCRAARAAIGTICCYTT	KGTFFGNYK
Z-CH-P4	GGIARIGCIARDATDATICCGIIRCA	CPGIILALP
Z-PAL-P4	YTCIACYTCYTTIGGIARIACIGC	AVLPKEVE

Figure 12

Gene Name	Size of the genes	Size of the partial clone	Strain File Designation
Alcohol dehydrogenase (ADH)	~1300 bp	938 bp	S19
Cinnamate 4-hydroxylase (CH)	~1500 bp	1083 bp	S20
Phenylalanine ammonia lyase (PAL)	~2000 bp	910 bp	S21
Peroxidase (POX)	~950 bp	590 bp	S2

Figure 13

GTGGCGTGGGAACCGGGGAAACATTGGTTATGGAGGAAGTTGACGTGCACCCACCGCAGAAAGATGAGGTTCTGTGTCAGATCAAGTTC 90
 V A W E P G K P L V M E E V D V A P P Q K D E V R V K I K F
 ACGGCACTCTGTACACCGATGTCTTTTGGGAAGCCAAGGGCCAAACGCCGGTGTCCCTCGTATCTTCGGTCACGAGGCCGGAGGG 180
 T A L C H T D V F F W E A K G Q T P V F P R I F G H E A G G
 ATTGTGGAAGTGTGGGGGAAGGCGTGACCGACGTCTGTCGGGAGATCAGTCTCCAGTTTTCACTGGGGAATGTAAAGAATGCCGC 270
 I V E S V G E G V T D V V P G D H V L P V F T G E C K E C R
 CACTGCAAAATCAGAAGAGAGTAATATGTGCGATCTCTTGAATAAACACCGATCGGGGTGTCATGCTGCTGATGGAAAATCTAGATTC 360
 H C K S E E S N M C D L L R I N T D R G V M L A D G K S R F
 TCCATCAAAGGCAAAACCAATCTACCATTTTGTGCGAACCTCCACTTTTCAGTGAATACACTATTGTGCATGTTGGTTGTTTGGCTAAGATC 450
 S I K G K P I Y H F V G T S T F S E Y T I V H V G C L A K I
 AACCTGAAGCACCTCTTGACAAAGTTTGCAATCTTAGCTGTGGAATTTCCACCGGATTTGGCGCGACGGTTAATGTGGCAAAGCCGACC 540
 N P E A P L D K V C I L S C G I S T G F G A T V N V A K P T
 AAAGGTTCTTCCGTGCGCGTCTTGGGCTGGGAGCCGTGGTCTTTCTGCTTGTGAAGGAGCGAGGGTTTCTGGAGCGGCAGAAATAATC 630
 K G S S V A V F G L G A V G L S A C E G A R V S G A A R I I
 GGTATCGACATCAATCCTGATAGATTTGAAGAAGCTAGGAAATTCGGGTGCACTGATTTTGTGAATCCAAAGGAACACACCAAACCTGTT 720
 G I D I N P D R F E E A R K F G C T D F V N P K E H T K P V
 CAAGAGGTTATTGCTGAAATGACCGACGGTGGAGTAGATCGTTGTTTGGAAATGTAAGGTAACATCAACGCCATGATTTCTGCATTGAA 810
 Q E V I A E M T D G G V D R C L E C T G N I N A M I S A F E
 TGGCTCCATGATGGATGGGGTGTGGCTGTTCTGGTGGGAGTTCTCAGAAAGATGCAGTTTTCAAGACTCACCCTGCAATTTCTGAGT 900
 C V H D G W G V A V L V G V P Q K D A V F K T H P L Q F L S
 GAAAAACACTCAAGGGCACCTTACTTCGGCAACTATAA 939
 E K T L K G T L L R Q L .

Figure 14

Z. Marina V - - - - - AWE DGKPLVM EEVDVAPPQKD EVRVKIKFTALCHTDVFFW 41
Arabidopsis MSTTGQIIRCAAAVAWEAGKPLVIEEVVAPPQKEH EVRIKILFTSLCHTDLYFW 54
Corn MATAAGKVIKCAAAVAWEAGKPLSIEBVEVAPPQAM EVRVKILFTSLCHTDVYFW 54
E. Coli MKS - - - - - RAAVAFAPGKPLEIVEIDVAPPKKGEVLIKVTHTGVCHTDAFTL 47

Z. Marina EAKGQTDVFPRIFGHEAGGIVESVGEGVTDVYPGDHVLPLVFTGCEKCECRHCKSEESNMCD 101
Arabidopsis EAKGQTPLPFRIFGHEAGGIVESVGEGVTDLPAGDHVLPFTTGECEGCRHCKHSEESNMCD 114
Corn EAKGQTPVFPRIFGHEAGGIESVGEGVTDVAPGDHVLPLVFTGCEKCECAHCKSAESNMCD 114
E. Coli SGDDPEGVFFVVLGHEGAGVVEVGEGVTSVKPAGDHVLP LYTABCEGCECFGRSGKTNLCV 107

Z. Marina LLRINTDRGVMLADGKSRSFSIKGKPIYHFVGTSTFSEYTIIVHVGCLAKINPEAPLDKVC I 161
Arabidopsis LLRINTERGGMIH DGE SRSFSINGKPIYHFLGTSTFSEYTVVHSGQVAKINPDAPLDKVC I 174
Corn LLRINTDRGVMI G DGKSRSFSINGKPIYHFVGTSTFSEYTVMHVGCVAKINPQAPLDKVCV 174
E. Coli AVRRETQGGK-LMP DGTTRFSYNGQPLYHYMGCS TFSSEYTVVAEVS LAKINPEANHEHYCL 166

Z. Marina LSCGISTGFEGATLVNVAKPTKGSVAVFGLGAVGLSACEGARVSGAARIIGIDINPDRFEE 221
Arabidopsis VSCGLSTGLGATLVNVAKPKKGGQSVAIIFGLGAVGLGAAEGARIAGASRIIGVDNFNSKRF DQ 234
Corn LSCGISTGLGASINVAKPPKGS TVAVFGLGAVGLAAAEAGARIAGASRIIGVDLNPFSRFE E 234
E. Coli LGCGVTTGIGAVHNTAKVQPGDSVAVFGLGAI GLAVVQGARQA KAGRIIAIDTNPKKFDL 226

Z. Marina ARKFGCTDFVNPK EHTKPVQVEVIAEMTDGGVDRCLECTGNIINAMISAFECVHDGWSVAVL 281
Arabidopsis AKEFGVTECVNPKDHDKPIQQVIAEMTDGGVDRSVBC TGSVQAMIQAFECVHDGWSVAVL 294
Corn ARKFGCTDFVNPKDHKKPVQVEVIAEMTNGGVDRSVBC TGNINAMIQAFECVHDGWSVAVL 294
E. Coli ARRFEGATDCINPNNDYDKPIKDVLDINKWGI DHTFECIGNVNVVMRAALESAHRGWGQSVI 286

Z. Marina VGVFPQKDAVF KTHPFLQFLSEKTLKGT - - - - - L - - - - - 308
Arabidopsis VGVPSKDDAFKTHPMNPLNERTLKGTFFGNYPKPKTDIPGVVEKYMKNKELELEKFIHTHTVP 354
Corn VGVPHKDAEFKTHPMNPLNERTLKGTFFGNYPKPKTDLPNVLVLYMKKKELEVEKFIHTHTVP 354
E. Coli IGVAVAGQ EISTRFQLVTGRVWKGSAPGGVKGRSQ LPGMVREDAMKGDIDLEPFPVTHTMS 346

Z. Marina LRQL - - - - - 313
Arabidopsis FSEINKAFDYMLKGESIRCI - - - - - TMGA 379
Corn FAEINKAFNLMAKGE GIRC I - - - - - RMEN 379
E. Coli IDEINDAFDLMHGK SIRT V - - - - - R - - - - - Y 369

Figure 15

0395442.0540.1

CAGGAGATGGTGTTCACGGTGTATGGCGATCACTGGAGGAAGATGCGGAGGATCATGACTGTGCCTTTTTTACCAACAAGGTCGTCCAA 90
 Q E M V F T V Y G D H W R K M R R I M T V P F F T N K V V Q
 CAGTACCGATTGGATGGGAGGATGAGACGAAAAGAGTCGTGGAGGATTTAGAGGCCAACCCCAAAGCCGCGACGGAAGGGACTGTGCTG 180
 Q Y R F G W E D E T K R V V E D L E A N P K A A T E G T V L
 AGGAGGAGGTTGCAGCTGATGATGTACAATAATCTGTACAGAATCATGTTTGACCGGAGGTTGAGAGTGAAGATGATCCTTTGTTTCTG 270
 R R R L Q L M M Y N N L Y R I M F D R R F E S E D D P L F L
 AAGCTCAAGGCGTTGAACGGGGAGAGGAGTAACTGGCGCAGAGCTTCGACTACAACACGGAGATTTATCCCCATCTTGAGACCTTTT 360
 K L K A L N G E R S K L A Q S F D Y N Y G D F I P I L R P F
 CTGAAAGGCTACCTTAAGAAATGCCAAGAGTTGAAGGACAATCGAATTAAGCTGTTTAAGGATTACTTCGTCGACGAGAGGAGGAAGTTG 450
 L K G Y L K K C Q E L K D N R I K L F K D Y F V D E R R K L
 TTAGGTTGATGACCTCCAAGTCGGAACAGCAGAAGTGGCCCATCGATCATATTCTGGAAGCCGAGAAGAAAGGAGAGATCAATGAGGAC 540
 L G S M T S K S E Q Q K C A I D H I L E A E K K G E I N E D
 AACGTCCTGTACATCGTGGAGAACATCAACGTCGCCGCCATTGAGACGACACTATGGTCGGTGGAGTGGGGGGTGGCGGAGTTGGTGAAC 630
 N V L Y I V E N I N V A A I E T T L W S V E W G V A E L V N
 CACCCGAAATCCAGAAGAACTGAGACACGAGTTGGACACTGTACTCGGCCCGGCGTACAGGTGACCGAACAGACACGGCGAAGCTT 720
 H P E I Q K K L R H E L D T V L G P G V Q V T E P D T A K L
 CCGTACCTCCAAGCTGTATCAAGAGACCTTACGTCTCCGCATGGCAATCCCTCTTTTGGTGCCGCACATGAACCTTCACGATGCGAAA 810
 P Y L Q A V I K E T L R L R M A I P L L V P H M N L H D A K
 CTCGGAAGCTACGACATCCCTGCCGAGAGCAAGATTCTTGCAACGCATGGTTCTGGCTAACAATCCGGAGAAGTGAAGAATCCGGAG 900
 L G S Y D I P A E S K I L V N A W F L A N N P E K W K N P E
 GAGTTCAGACCGGAGAGGTTTCATGGAAGAAGAGTCCAAGGTCGAAGCTAGTGGGAACGACTTCAGGTACTTGCTTTTGGCACTGGAAGG 990
 E F R P E R F M E E E S K V E A S G N D F R Y L P F G T G R
 AGGAGCTGTCCCGGATAATCTTGGCCCTCCCAAGGGCGAATTCTGCAGATATCCATCACAACCTGGCGGCGCTCGAGCATGCATCTAGAG 1080
 R S C P G I I F A L P R A N S A D I H H T G G R S S M H L E
 GGCCC 1085
 G P

Figure 16

Z. Marina	-----0
Citrus	M D L N G W C N S G N Q N M C C C Q S Y ----- V K R G Y D R V L ----- S F N G L I T V S K L R G K R F K L 47
Kidney bean	M ----- T K L L ----- H S Y F S I P F S P F Y V S I P I A T V L F V L I I V N F F L A S K N H S S ----- T 44
Z. Marina	-----0
Citrus	P P G P L P V P V F G N W L Q V G D D L N H R N L S D L A K K Y G D V L L L R M G Q R N L V V V S S P D H A K E V L H T 107
Kidney bean	P P G P L S V E I F G N W L K V G N D L N H R V I T S M S Q T Y G P V F L L K L G S K N L V V V S D P E L A T Q V L H S 104
Z. Marina	-----39
Citrus	Q G V E F G S E T R N V V F D I F T G K G Q D M V F T V Y G E H W R K M R R I M T V P F F T N K V V Q Q Y R F G W E D E 167
Kidney bean	Q G V E F G S R P F R N V V F D I F T G K G K M V F T V Y G E H W R T M R T I M N L P F F T K K G V H N Y S T M W E E 164
Z. Marina	-----99
Citrus	T K R V V E D L E A N F K A A T E G T V L R R R L Q L M M Y N N L Y R I M F D R R F E S E D D P L F L K L K A L N G E R 99
Kidney bean	A A R V V E D V K K D P E A A T N G I V L R R R L Q L M M Y N N M Y R I M F D R R F E S Q D D P L F N R L K A L N G E R 227
	M E L V V R D L K V N E H V R S E G I V I E K R L Q L M L Y N I M Y F M M F D A K F E S O E D P L F I Q A T R F N S E R 224
Z. Marina	-----159
Citrus	S K L A Q S F D Y N Y G D F I P I L R P F L K S Y L K K C Q E L K D N R I K L F K D Y F V D E R R K L L G S M T S K S E 159
Kidney bean	S R L A Q S F E Y N Y G D F I P I L R P F L R G Y L K I C K E V K E R R L Q L F K D Y F V E E R K K L A S T K S M S N E 287
	S R L A Q S F E Y N Y G D F I P I L R P F L R G Y L N K C K D L Q S R R L A F E N T H Y V Q K R R Q I M A A N G E K H - 283
Z. Marina	-----219
Citrus	Q Q K C A I D H I L E A E K K G E I N E D N V L Y I V E N I N V A A I E T T L W S V E W G V A E L V N H P E I Q K K L R 219
Kidney bean	S L K C A I D H I L D A Q T K G E I N E D N V L Y I V E N I N V A A I E T T L W S I E W G I A E L V N H P E I Q K K L R 347
	K I S C A I D H I T D A Q M K G E I S E E N V T Y I V E N I N V A A I E T T L W S M E W A I A E L V N H P S V Q S K R 343
Z. Marina	-----279
Citrus	H E L D T V L G P G V Q V T E P D T A K L P Y L Q A V I K E T L R L R M A I P L L V P H M N L H D A K L G S Y D T P A E 279
Kidney bean	N E L D T V L G P G H C I T E P D T H K L P Y L Q A V I K E T L R L R M A I P L L V P H M N L H D A K L G G V D V P A E 407
	D E I S E V L - K G E P V T F S N L H E L P Y L Q A T V K E T L R L H T P I L L V P H M N L E E A K L G G Y T V P K E 402
Z. Marina	-----336
Citrus	S K I L V N A W F L A N N P E K W K N P E E F R P E R F M E E S K V E A S G N --- D F R Y L P F G T G R R S C P G I 336
Kidney bean	S K I L V N A W W L A N N P A Q W K K P E E F R P E R F L E E S K V E A N G N --- D F R Y L P F G V G R R S C P G I 464
	S K V V V N A W W L A N N P S W W K N P E E F R P E R F L E E E C A T D A V A G G K V D F R F V P F G V G R R S C P G I 462
Z. Marina	-----361
Citrus	I F A L P R ----- A N S A D I H H T G G R S S M H L ----- E G 361
Kidney bean	I L A L P I L G I T I G R L V Q N F E L L P P E G Q S K I D T A E K G G Q F S L H I L K H S T I V A K P R S F 519
	I L A L P I L G L V I A K M V S N F E L - S A P O G T K I I V N E K G G O F S L H I ----- A N Y S T V L 510
Z. Marina	-----361
Citrus	-----519
Kidney bean	F H P I R T Q -----517

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Figure 17

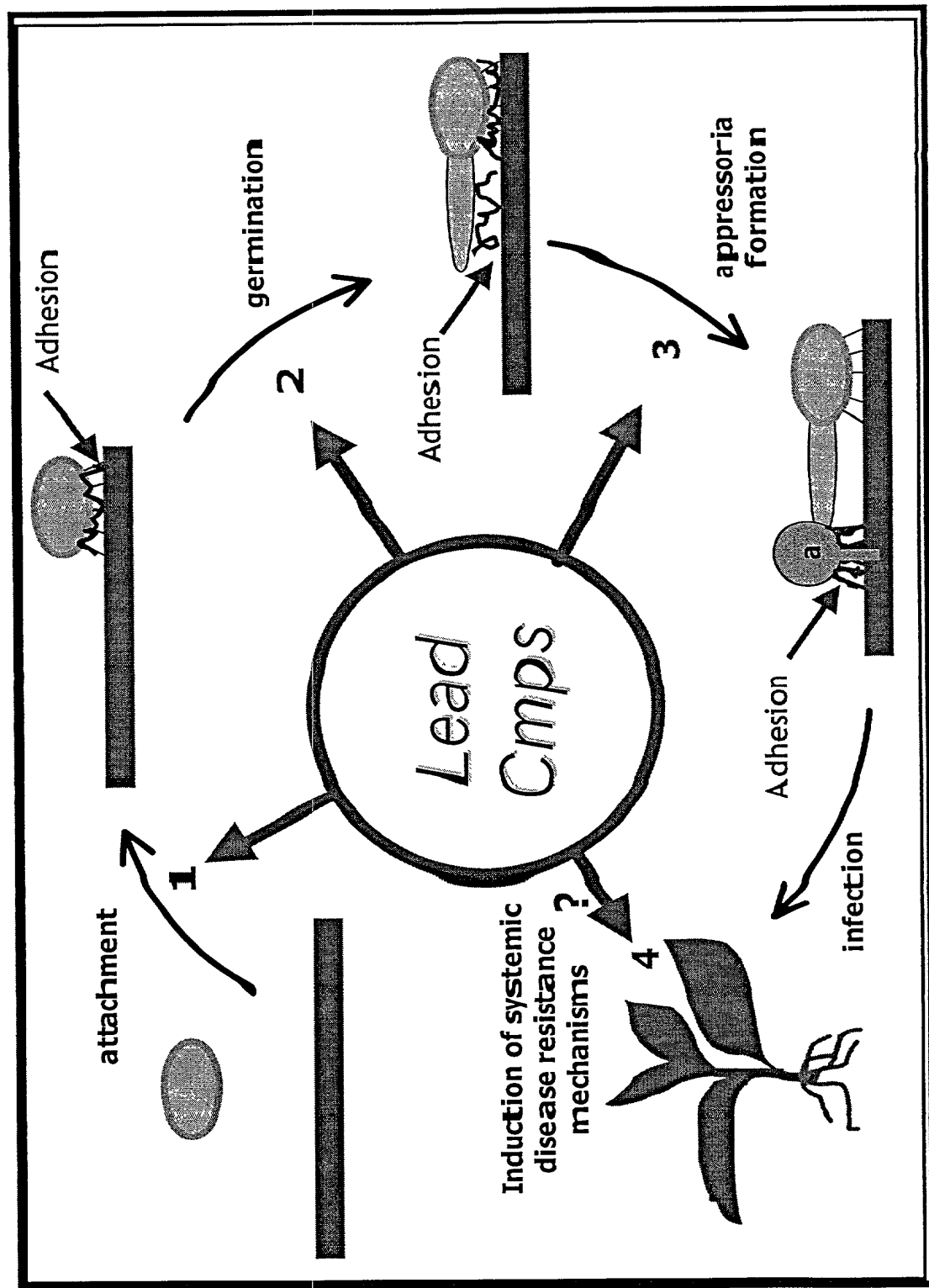
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 P Q V E V I R A S T K S I E R E I N S V N D N P L I D V S R
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 N K A L H G G N F Q G T P I G V S M D N T R L A I A A I G K
 ACTCATGTTCGCCCAGTTCTCCGAGTTGGTGAACGACTTCTACAACAACGGAATTCCTCGAATCTATCCGGTGGCAGGAACCCAAGTCT 360
 L M F A Q F S E L V N D F Y N N G L P S N L S G G R N P S L
 TGATTACGGATTCAAAGGTGGAGAAATCGCCATGGCTTCTATTGTTCCGAGCTTCAGTTCTCGCAAACCCAGTAACCAACCAACGTTCA 450
 D Y G F K G G E I A M A S Y C S E L Q F L A N P V T N H V Q
 ATCCGCCGAGCAACACAACCAAGATGTAATTCTCTCGGTCTCATCTCCGCCAGAAAGACGGCGGAATCAATCGAGATTCTAAAGCTCAT 540
 S A E Q H N Q D V N S L G L I S A R K T A E S I E I L K L M
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 T S T F L V G I C Q A I D L R H M E E N L K A S V K N T V S
 TCAAGTGGCGAAACGCGTCTCACCATGACCGCTAACGGTGAGCTCCACCCCTCCCGTTTCTGCGAGAAAGACCTTCTGAAAGTAGTTGA 720
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 L N N G D K E K D E A M S I F Q K I A V F E E E L I A V F P
 CAAGGAGGTCTGA 912
 K E V E

50
 40
 30
 20
 10
 0

Figure 18

Z. Marina	-----	0
Arabidopsis	NDQIEAMLCGGGEKTKVAVT--TKTLADPLNWGLAADQMKGSHLDEVKKMVEEYRPPVVN	58
Wheat	M-----ACAWRSRSRADPLNWGKAAEELS GSHLEAVKRMVEEYRKPPVVT	44
Z. Marina	-----	0
Arabidopsis	LGGETLTIGQVAAISTVGGSVKVELAETSRAGVKASSDWVME SMNKGTDSYGVTTFGFGAT	118
Wheat	MEGAT-TIAMVAAVAA-GSDTRVEIDESARGVKESSDWVMNSMMNGTDSYGVTTFGFGAT	102
Z. Marina	-----	0
Arabidopsis	SHRRTKNGTALQTELIRFLNAGIFGNTKETCHTLPQSATRAAMLVRVNTLLQGYSGIRFE	178
Wheat	SHRRTKEGGALQRELIRFLNAGAFGTGT DG-HVLPAAATRAAMLVRVNTLLQGYSGIRFE	161
Z. Marina	-----SIT-----FVWRPSSF-----	12
Arabidopsis	ILEATITSLLNHNISPSLPLRGTTITASGHLVPLSYIAGLLTGRPN SKATGPDGESL TEKEA	238
Wheat	ILETITATLLNANVTPCCLPLRGTTITASGDLVPLSYIAGLLV TGRPN SMATA PDGSKVNAAEA	221
Z. Marina	-----	12
Arabidopsis	FEKAGISTGFEDLQPKEGALVNGTAVGSGMASMVLFEANVQAVLAEVLSAIFAEVMSGK	298
Wheat	FKIAGIOHGFEELOPKEGLAMVNGTAVGSGLASMVLFEANVLSLLAEVLSGVFCEVMNGK	281
Z. Marina	-----KKS KODRYALRTSP	26
Arabidopsis	PEFTDHLTHRLKHHFGQIEAAAIMEHILDGSSYMKLAQVHEMDPLQKPKQDRYALRTSP	358
Wheat	PEFTDHLTHKLKHHFGQIEAAAIMEHILEGSSYMMMLAKKRLGELDPLMKPKQDRYALRTSP	341
Z. Marina	QWLGPQVEVIRASTKSIEREINSVNDNPLIDVSRNKALHGGNFQGTPIGVSMNTRLAIA	86
Arabidopsis	QWLGPQIEVIRQATKSIEREINSVNDNPLIDVSRNKALHGGNFQGTPIGVSMNTRLAIA	418
Wheat	QWLGPQIEVIRAAATKSIEREINSVNDNPLIDVSFGKALHGGNFQGTPIGVSMNTRLAIA	401
Z. Marina	AIGKLMFAQFSELVNDFYNNGLPSNLSGGRNP SLDYGFKGGEIAMASYCSELQFLANPVT	146
Arabidopsis	AIGKLMFAQFSELVNDFYNNGLPSNLTASSNP SLDYGFKGAEIAMASYCSELQYLANPVT	478
Wheat	AIGKLMFAQFSELVNDFYNNGLPSNLSGGRNP SLDYGFKGAEIAMASYCSELQFLGNPVT	461
Z. Marina	NHVQSAEQHNQDVNSLGLISARKTAESLEILKLMTSTFLVGICQCAIDL RHMEENLKA SVK	206
Arabidopsis	SHVQSAEQHNQDVNSLGLISSRKTSBAVDILKLMSSTFLVGICQAVDLRHLEENLRQT VK	538
Wheat	NHVQSAEQHNQDVNSLGLISSRKTAEAIDILKLMSSTFLVALCOAIDL RHLEENLVNNAVK	521
Z. Marina	NTVSQVAKRVLTMTANGELHPSRFCEKDLLKVV DREYVFSYI DDPCSATYPLMQKLS VL	266
Arabidopsis	NTVSQVAKKVLTTGINGELHPSRFCEKDLLKVV DREQVFTYVDDPCSATYPLMQRLRQVI	598
Wheat	SCVKTVARKTISTDNNGHLENA SFCEKDILITIDREAVFAYADDP CSANYP LMQKMRRAVL	581
Z. Marina	VDHALNNGDKKDEAMSSIFOKIAYFEEELIAVFPKEV	303
Arabidopsis	VDHALSNGETEKNAVTSIFOKI GAFEEELKAVLPKEVEAARAAYGNGTAPIPNRIK ECRS	658
Wheat	VEHALANGFAFAHVE TSVFAKLAMFQEIRAVLPKEVEAARS AVE NGTAAQQNRIA ECRS	641
Z. Marina	-----	303
Arabidopsis	YPLYRFVREELGTKL LTGEKVVSPGEEFDRVFTAMCEGKLIDPLMDCLKEWNGAFI IIC	717
Wheat	YPLYRFVRKELGT EYLTGEKTRSPGEEFVDRVFTAMNQGRHIDALLECLKEWNGEPLHLIC	700

Figure 19



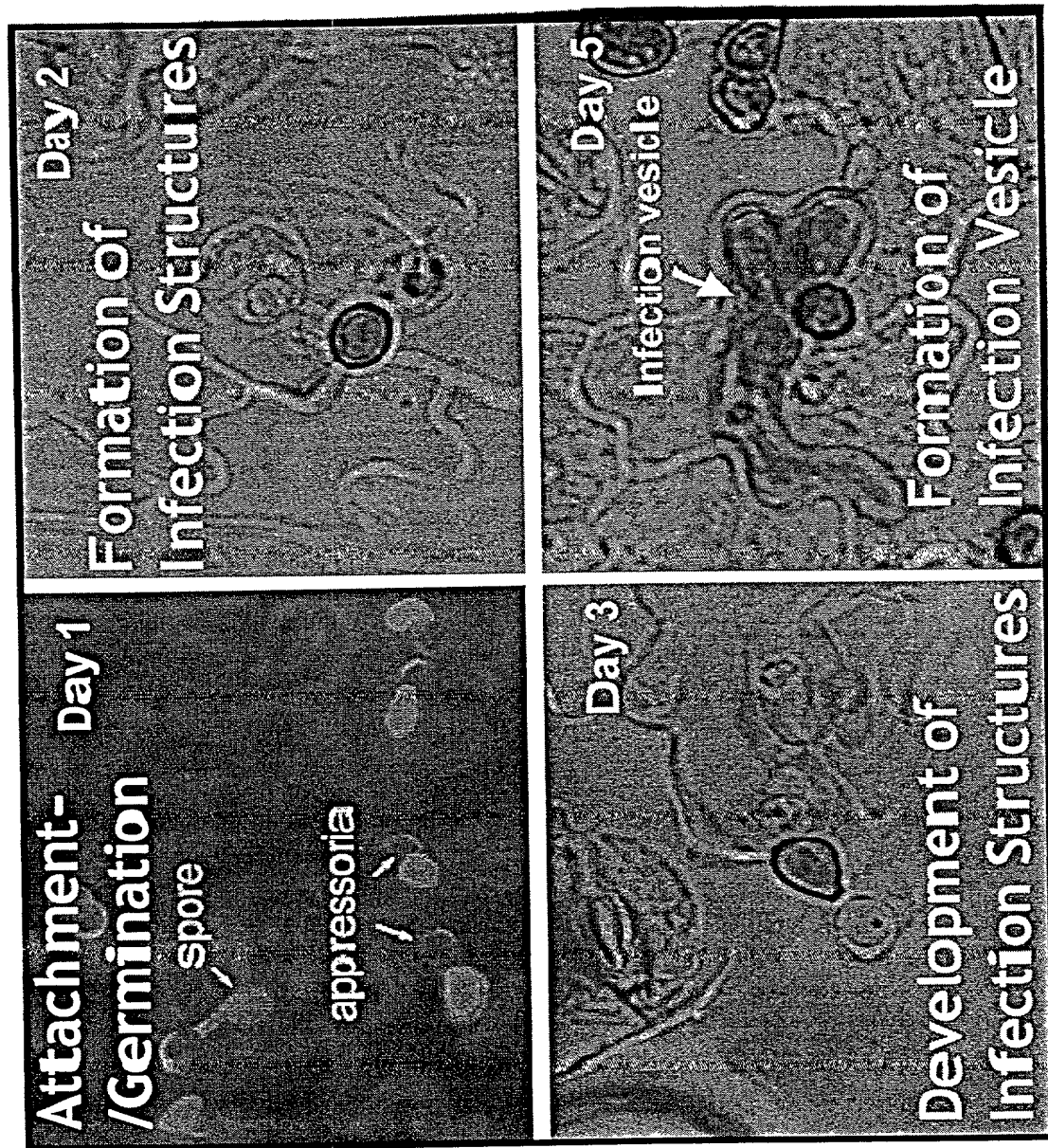


Figure 21A

	Disease	Fungus	Crops
Ascomycetes	Glume Blotch	<i>Septoria nodorum</i>	Cereals
	Leaf Spot	<i>Septoria tritici</i>	Cereals
	Powdery Mildew	<i>Erysiphe</i> spp.	Cereals Grapes
	Leaf Blotch	<i>Rhynchosporium secalis</i>	Cereals
	Stem Canker	<i>Leptosphaeria maculans</i>	Cereals
Basidiomycetes	Yellow Rust	<i>Puccinia striiformis</i>	Cereals
Oomycetes	Blue mold	<i>Peronospora tabacina</i>	Tobacco
	Eyespot	<i>Pseudocerospora herpotrich</i>	Cereals

Figure 21B

Taxa	Disease	Fungus	Plant Infection	In vitro adhesion	Plant adhesion
Ascomycetes	Rice Blast	<i>Magnaporthe grisea</i>	✓	✓	✓
	Brassica Dark Leaf Spot	<i>Alternaria brassicicola</i>	✓	✓	ongoing
	Bean Anthracnose	<i>Colletotrichum lindemuthianum</i>	✓	✓	✓
	Strawberry Anthracnose	<i>C. fragariae</i> <i>C. acutatum</i>	✓	✓	✓
	Avocado Anthracnose	<i>C. gleosporioides</i>	✓	Not Tested	Not Tested
	Green Mold	<i>Penicillium italicum/digitatum</i>	✓	Not Tested	Not Tested
	Apple Scab	<i>Venturia inaequalis</i>	✓	Not Tested	Not Tested
	Grey Mold	<i>Botrytis cinerea</i>	Not Tested	✓	Not Tested
	Leaf Spot	<i>Septoria tritici</i>	✓	Not Tested	Not Tested

Figure 22

	Disease	Fungus	Plant Infection	In vitro adhesion	In planta adhesion
Basidiomycetes	Wheat brown rust	<i>Puccinia recondita</i>	✓	✓	✓
Oomycetes Pythiaceae	Damping-off	<i>Pythium aphanidermatum</i>	✓	Ongoing	ongoing
	Potato late blight	<i>Phytophthora infestans</i>	✓	ongoing	ongoing
Peronosporaceae	Downy Mildew	<i>Peronospora parasitica</i>	ongoing	✓	ongoing

Figure 23

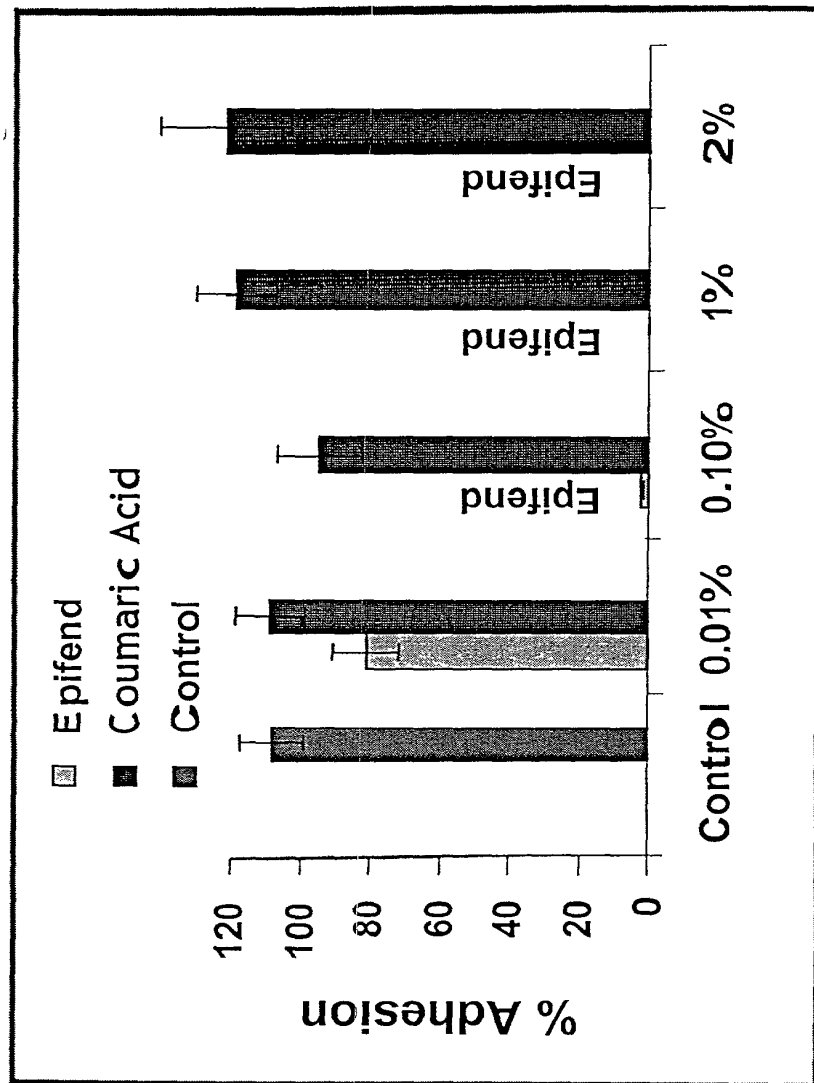


Figure 24

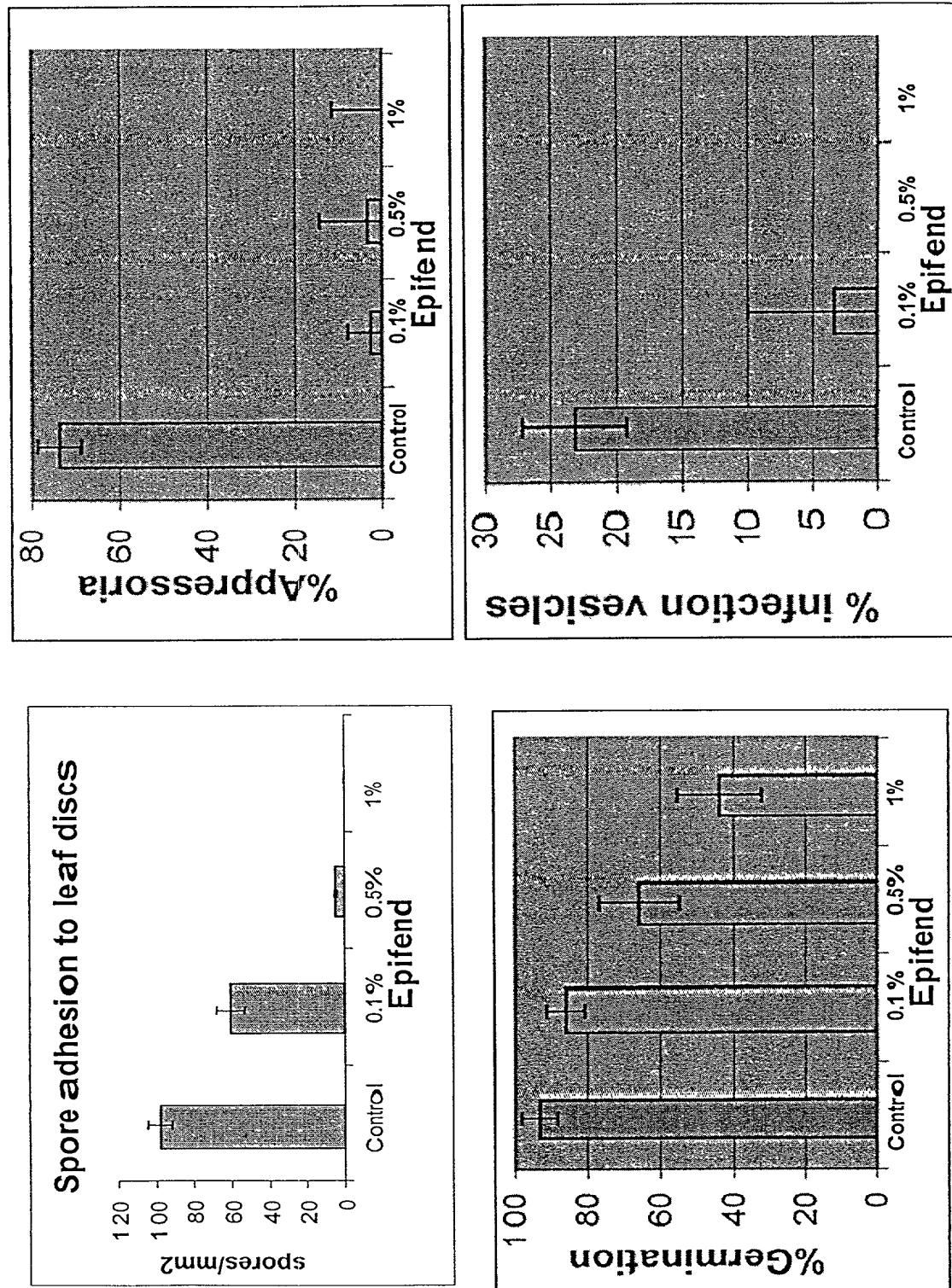


Figure 26

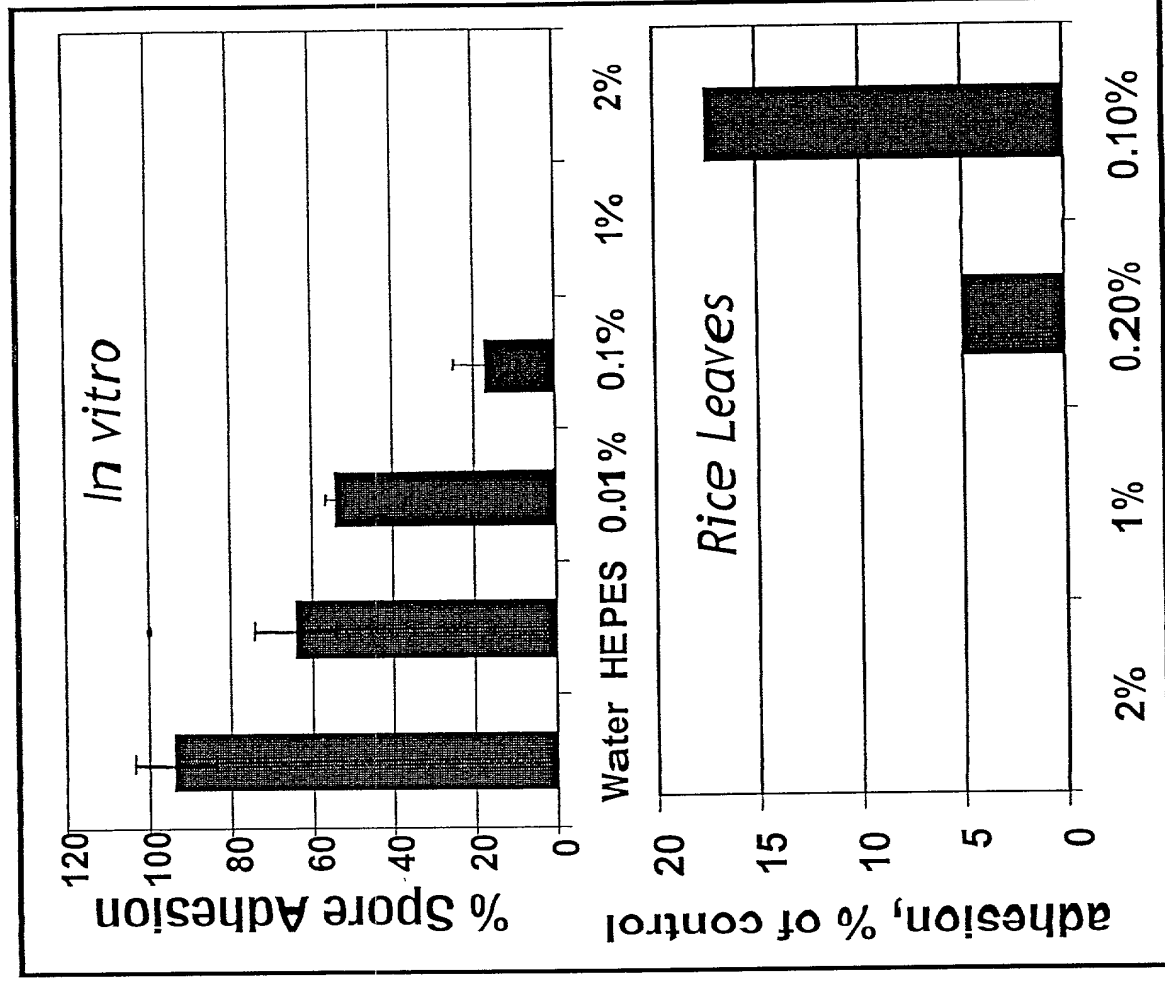
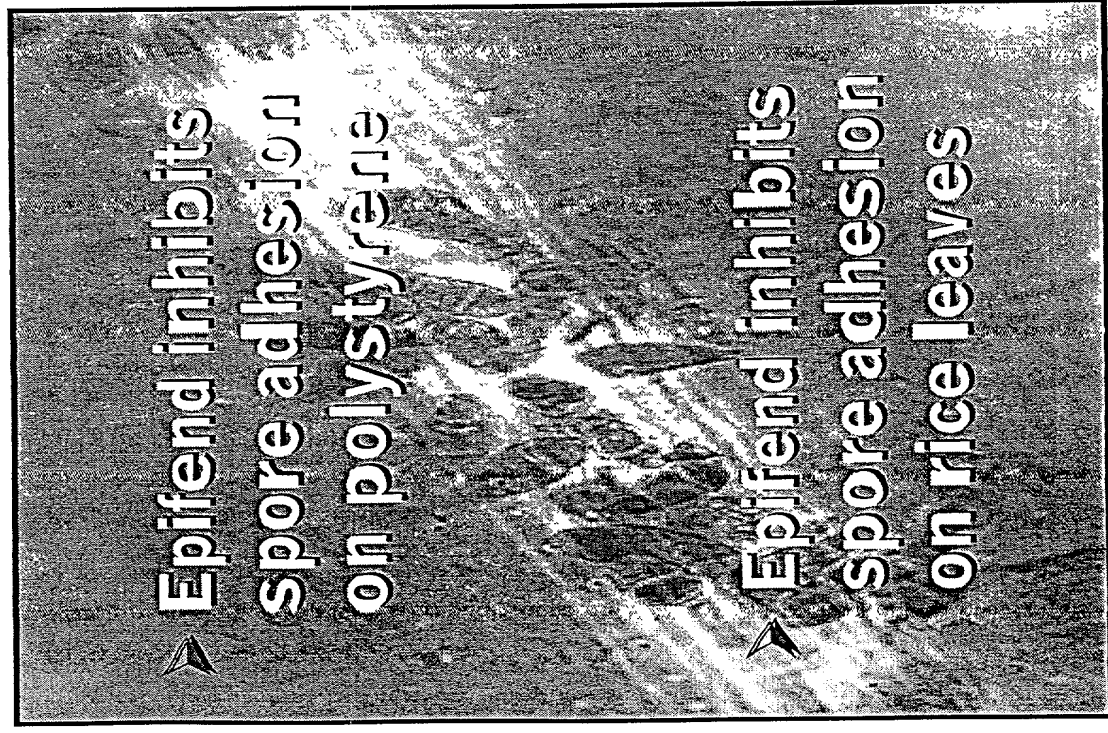


Figure 27

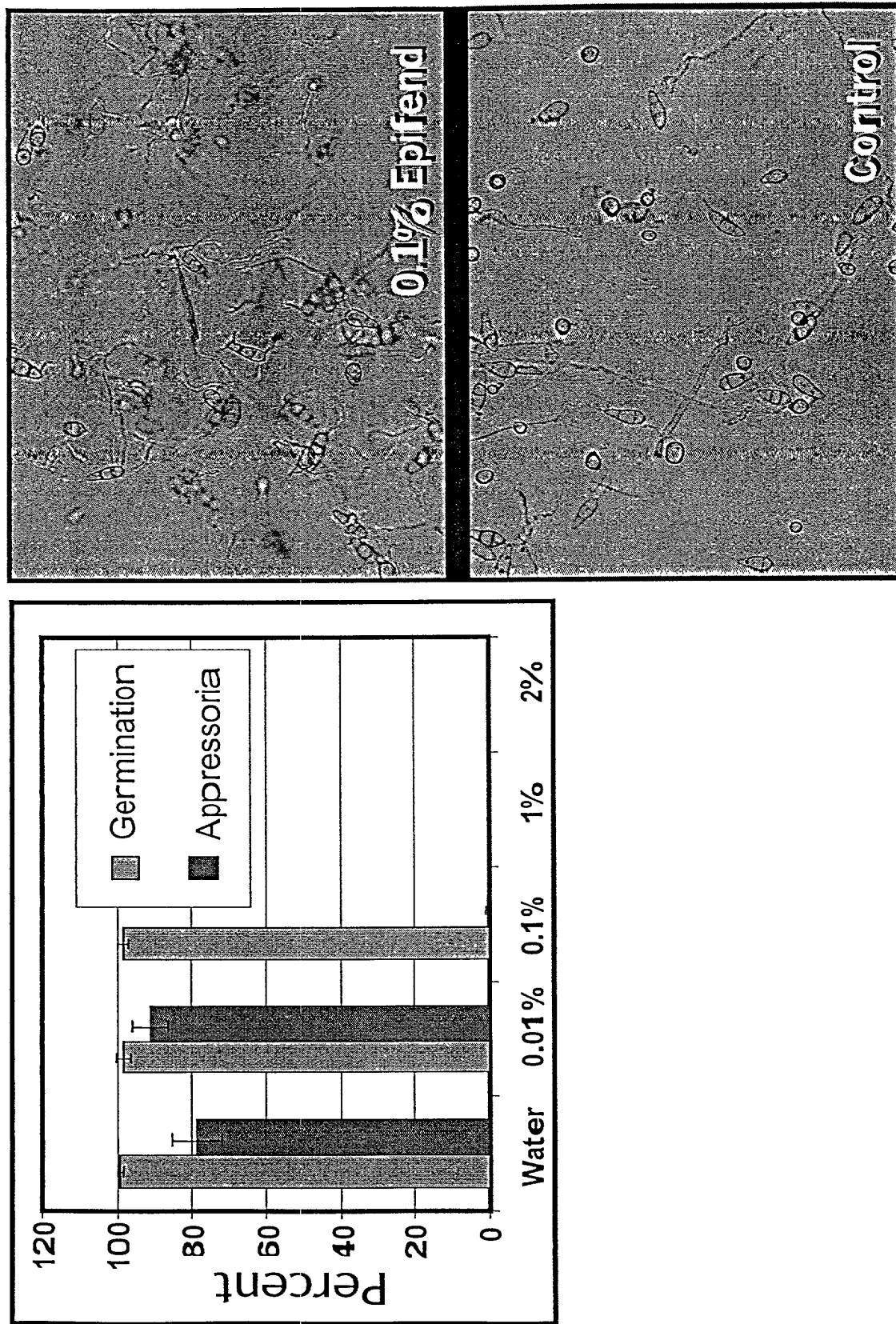


Figure 28

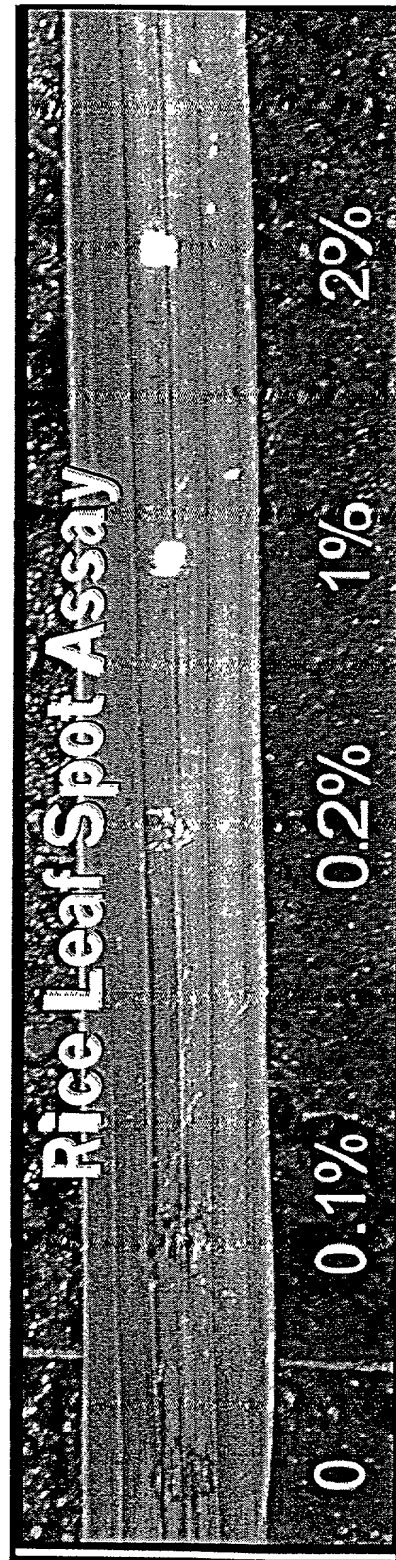
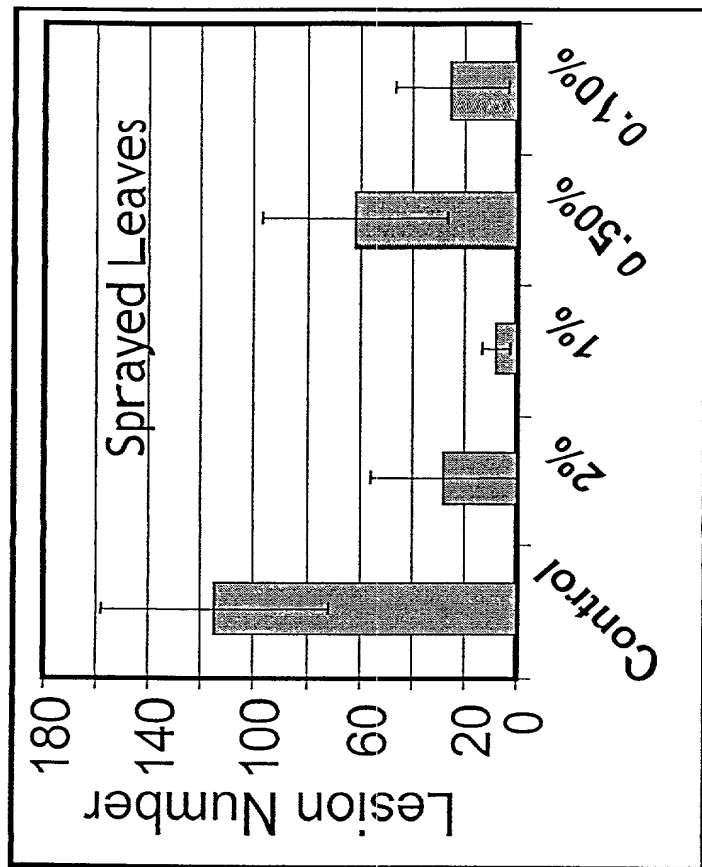
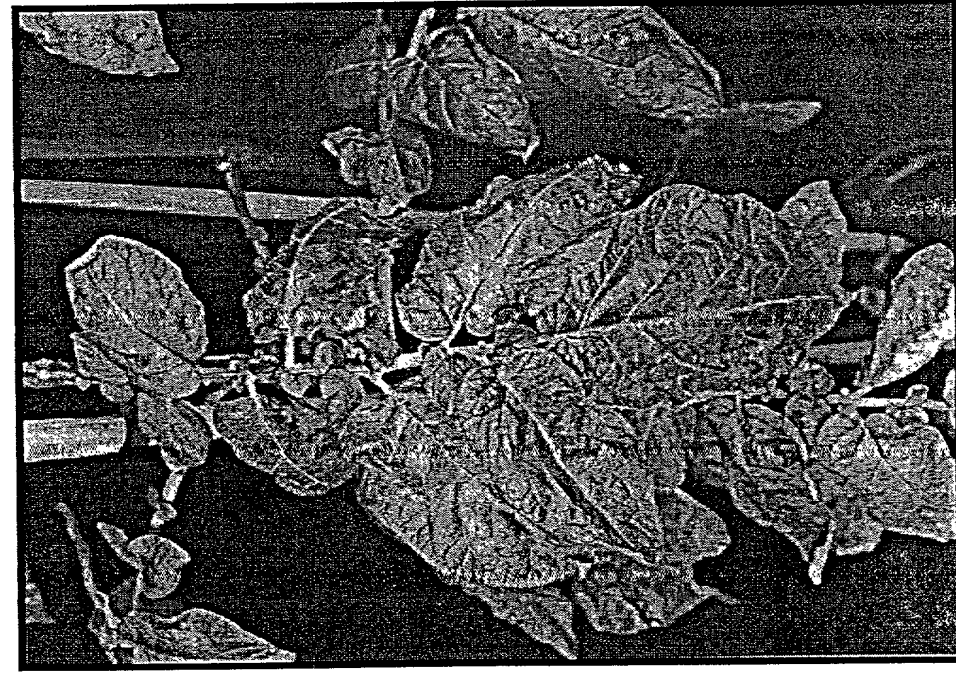


Figure 29

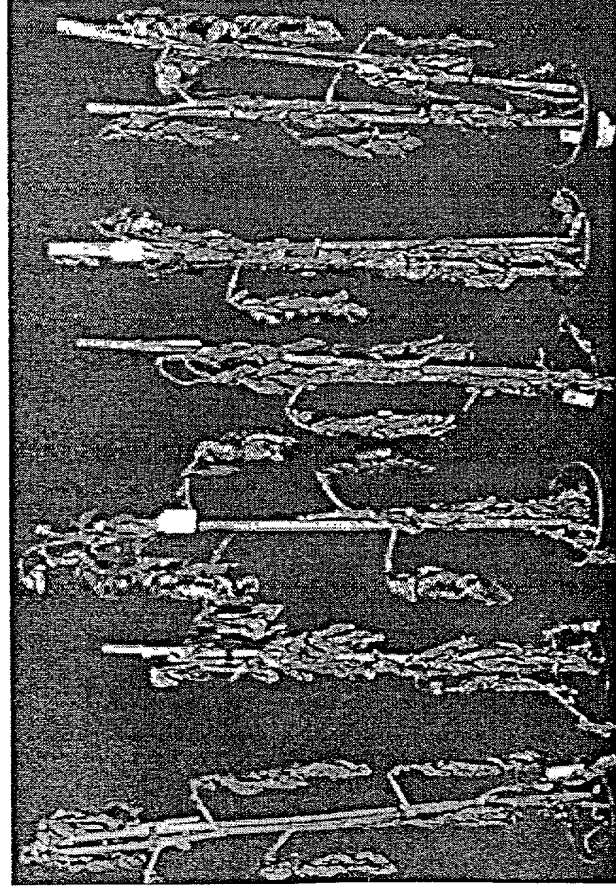


Control, 4 days



1% Epifend, 4 days

Figure 30



Control 11 days

1% Epifend 11 days

